GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF NOVEMBER 16, 1991

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5. Philippines:

TOPICAL STORMS CONTINUE TO BATTER ISLANDS.

Late in the week, Topical Storm Wilda roared through southern Luzon and northern Samar with heavy rain (up to 175 mm) and powerful wind gusts topping 100 km/hr. Wilda struck Manila on Sunday, according to press reports, and knocked out most of the cities electricity. Earlier in the week, Typhoon Seth weakened to a tropical storm before moving into northeastern Luzon. Wilda and Seth followed in the wake of Tropical Storm Thelma, the deadliest natural disaster to strike the Philippines since 1976 [2 weeks].

6. Central Indonesia:

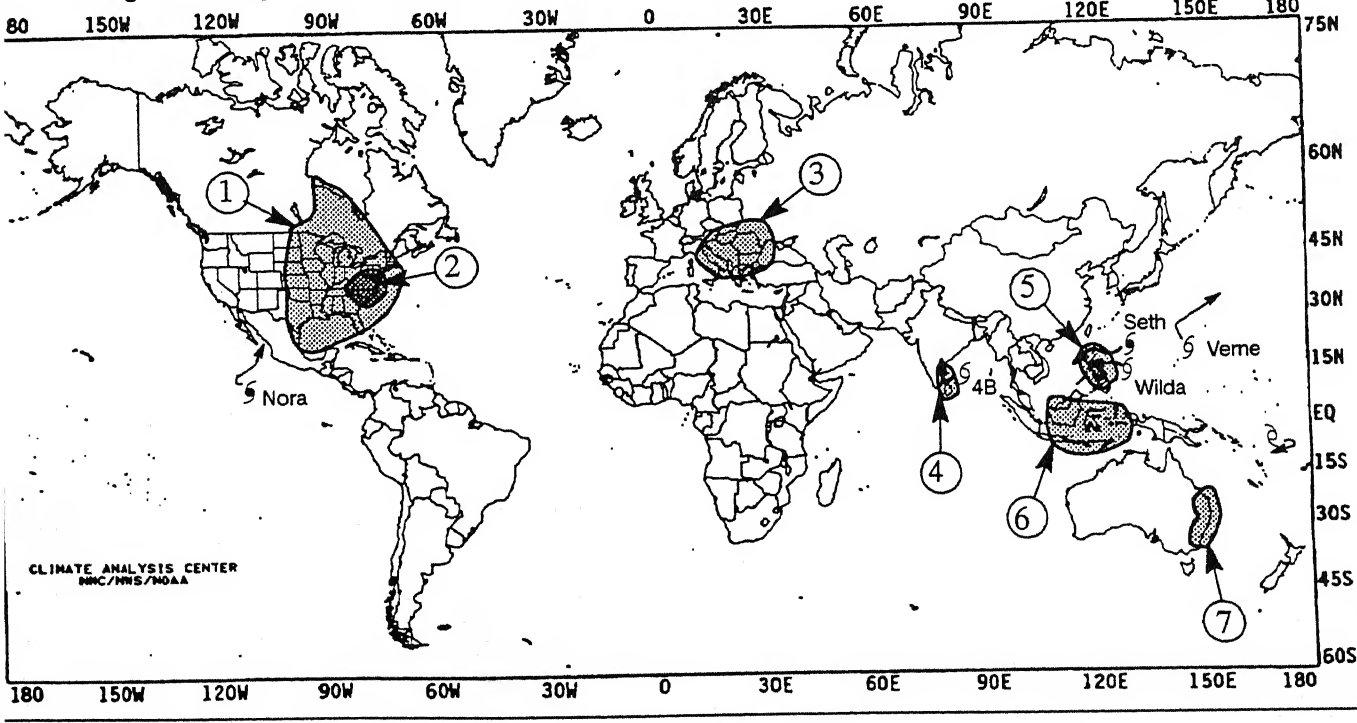
RAINS AGAIN PROVIDE ISOLATED RELIEF FROM DRYNESS.

Rainshowers (10 – 150 mm) were scattered across central Indonesia, easing dryness in parts of the nation. Many locations, however, still report six week moisture shortages of 50 – 250 mm [11 weeks].

7. Eastern Australia:

MODERATE RAINS SOAK NORTHERN AREAS, BUT DRYNESS PERSISTS FARTHER SOUTH.

The first significant rains since mid–June (10 – 50 mm) covered southern Queensland and northern New South Wales, providing relief from the prolonged dryness. Farther south, little or no rain fell on southern New South Wales, where moisture deficits of 50–100 mm have accumulated since early October [16 weeks].



EXPLANATION

EXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

.AP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long–term anomalies, and other details.

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two–week temperature anomalies.*
- *Global four–week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three–month precipitation anomalies (once a month).*
- *Global twelve–month precipitation anomalies (every three months).*
- *Global three–month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF NOVEMBER 16, 1991

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TEMPERATURES MODERATE LATE IN THE WEEK.

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2. Central Appalachians and the Southeastern United States:

COOL AND WET WEATHER REDUCES THREAT OF WILDFIRES.

A major storm early in the week brought rain to the central and southern Appalachians and Piedmont, with snow and freezing rain glazing the higher elevations. The moderate precipitation (15-50 mm) and lower temperatures helped to diminish wildfires that had plagued the Appalachians for the last several weeks. Little or no rain, however, fell on the remainder of the mid-Atlantic (see Figure 1). Moisture deficits of 50-100 mm have accumulated since the end of September at most locations [8 weeks].

3. Central and Southeastern Europe:

SEASONABLE TEMPERATURES END COLD SPELL.

Somewhat warmer air settled over central and southeastern Europe, bringing an end to the cold weather that had persisted in the region [Ended after 4 weeks].

4. Southern India and Sri Lanka:

TROPICAL CYCLONE UNLEASHES HEAVY RAIN.

Five people were killed and more than 20,000 rendered homeless by a cyclone that lashed the coast of southern India on Friday. The storm, packing winds of up to 100 km/hr and rainfall totals as high as 580 mm, crossed the coast near Pondicherry, causing extensive damage to crops and property as several rivers burst their banks, according to press repo Above normal rains have drenched much of south India and Sri Lanka during the last few weeks (inside back cover), where as much as 3 times nor rainfall has fallen since late October [3 weeks].

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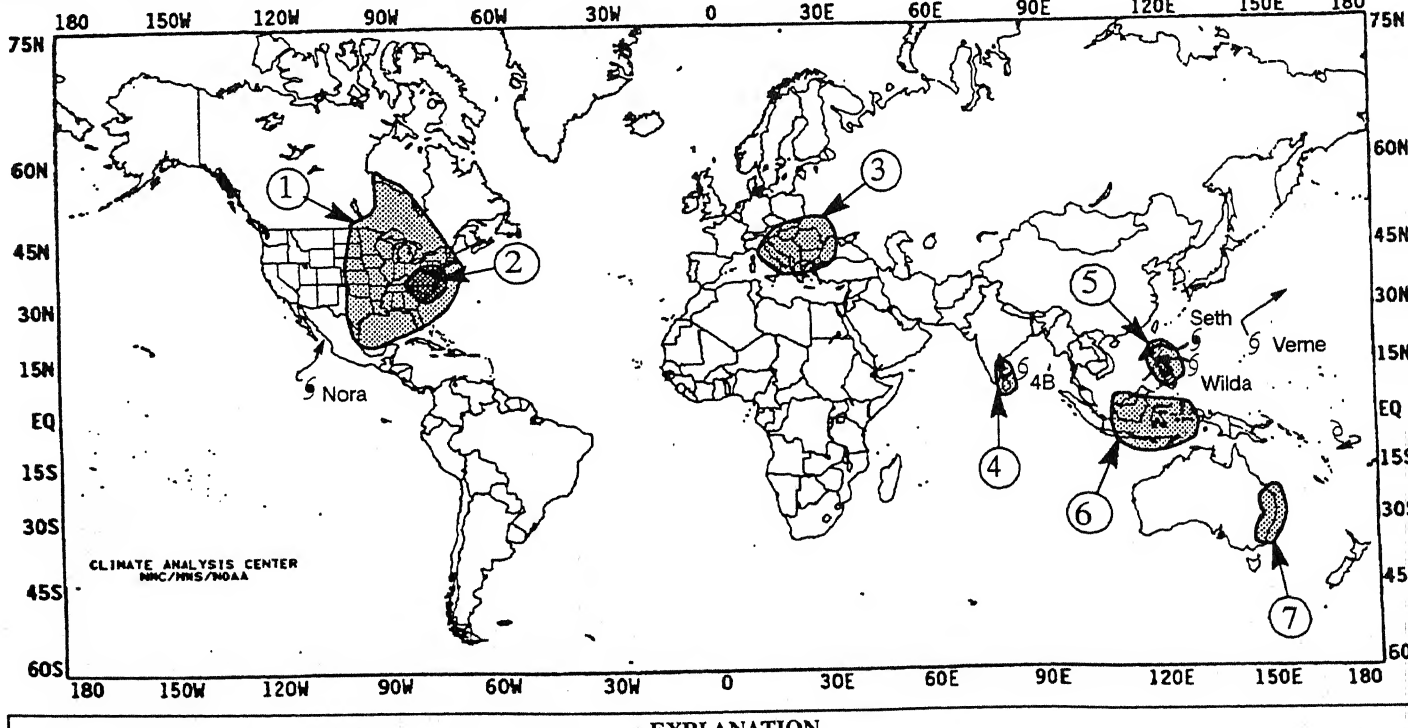

EXPLANATION

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MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two wee temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF NOVEMBER 10 – 16, 1991

An early–season cold wave that established over 640 daily record lows during Oct. 28–Nov. 11 throughout the eastern three–quarters of the country was finally replaced by much milder conditions. Temperatures in the nation's midsection rose to above normal levels, and chilly conditions early in the week throughout the eastern U.S. gradually moderated towards the week's end. Stormy weather pushed into the Pacific Northwest, the southern and central Rockies, and the central Plains, dumping heavy precipitation on parts of the area. Up to 29 inches of snow buried portions of southwestern Colorado while over a foot blanketed Flagstaff, AZ. Early in the week, a storm off the Atlantic Coast produced additional beach erosion and coastal flooding, but brought welcome rain to the parched mid–Atlantic, with snow and freezing rain at higher elevations. Fortunately, the frozen precipitation tamed the last of the brush and forest fires that scorched over 350,000 acres in the Appalachians since Oct. 26 (300,000 acres in West Virginia alone); however, the ice coated power lines and trees, causing widespread power outages. Farther west, Hawaii remained unusually mild and dry while Alaska's first significant cold wave of the season dropped readings to –49°F near Beaver and –41°F at Fort Yukon.

During the first half of the week, the aforementioned storm system tracked northward along the Atlantic Coast, generating beach erosion and coastal flooding but doing far less damage than the devastating Halloween storm. Rain from the system dampened most of New England while wet snow (6 inches at Hamburg, NY) blanketed higher elevations and far western sections. As the week progressed, the cold wave in the East slowly loosened its grip, but not before 38 record lows were set on Sunday and another 9 on Monday. Farther west, light precipitation fell on portions of the northwestern U.S. in association with a southeastward moving cold front. A tornado touched down near Portland, OR on Tuesday, but there were no reports of damage or injuries. Moisture from the remnants of Tropical Storm Nora streamed northeastward into southwestern Texas, triggering scattered light rain showers.

The latter half of the week saw the development of a major winter storm in the West while temperatures rebounded in the East. During mid–week, waves of low pressure developed along the cold front, producing up to 20 inches of snow in the mountains of Wyoming. A strong storm system eventually formed over the southern Great Basin and slowly trekked eastward, dumping heavy snow on higher elevations of Nevada, Utah, Arizona, New Mexico, and Colorado. Farther east, showers and thunderstorms formed over the southern and central Plains, providing welcome precipitation to the moisture–short winter wheat crop regions of southwestern Nebraska, western Kansas and Oklahoma, and northern Texas. On Saturday, a strong Pacific storm system approached the Washington and Oregon coasts, bringing gusty winds and heavy rain to the area.

According to the River Forecast Centers, the largest precipitation totals (more than 2 inches) were observed along coastal Washington, in the Cascades, central Rockies, central Great Plains, central New England, and extreme southeastern Alaska [Table 1]. Light to moderate amounts fell along the northern half of the Pacific Coast region, on the northern Intermountain West, most of the Rockies and Plains, and throughout much of the Midwest, Appalachians, mid–Atlantic, and New England. Although the recent precipitation alleviated the wild fires in the Appalachians, most of the mid–Atlantic was still extremely dry. Since Oct. 20, many locations had measured under an inch of precipitation, or less than 25% of normal [Figure 1]. Elsewhere, little or no precipitation occurred in California and the desert Southwest, across the upper Missouri Valley, northern Plains, and upper Midwest, and throughout the Southeast.

Much milder air covered the north–central states following last week's frigid weather as temperatures averaged between 5°F and 10°F above normal [Table 2]. Positive departures also occurred throughout most of the country east of the Mississippi River, but values were generally less than +5°F as colder air pushed into the West during the latter half of the week. This week's milder conditions were reflected by the lack of sub–zero readings across the contiguous U.S., quite a contrast from the previous two weeks.

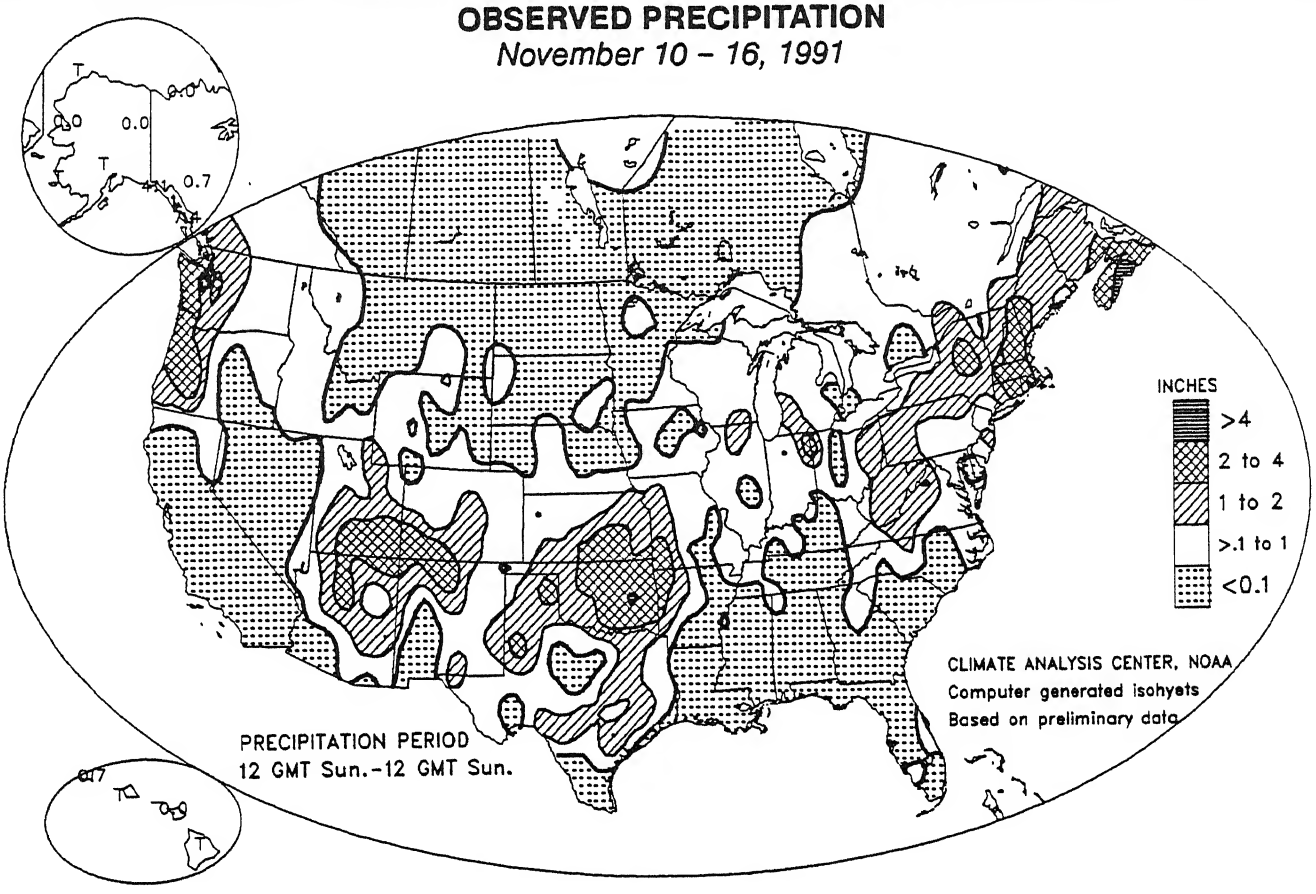
An exceptionally cold start to the week, particularly in the East, produced subnormal temperatures throughout the eastern half of the U.S. Departures less than –4°F were observed along the eastern Gulf and southern Atlantic Coasts and parts of the Appalachians and New England as lows dipped below freezing as far south as northern Florida. In Alaska, the season's first significant blast of bitterly cold Arctic air produced weekly departures as great as –17°F at Bettles and subnormal temperatures throughout the remainder of the state except along the southern coast [Table 3].

TABLE 1. *SELECTED STATIONS WITH 2.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF NOVEMBER 10 – 16, 1991*

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
KETCHIKAN, AK	7.39	WORCESTER, MA	2.78
ANNETTE ISLAND, AK	7.11	CONCORD, NH	2.56
YAKUTAT, AK	4.09	CHATHAM, MA	2.44
BLANDING, UT	4.00	PROVIDENCE, RI	2.30
QUILLAYUTE, WA	3.63	EUGENE, OR	2.20
MT WASHINGTON, NH	3.21	WICHITA, KS	2.15
WICHITA/MCCONNELL AFB, KS	3.16	CHICOPEE/WESTOVER AFB, MA	2.11
SITKA, AK	3.02	PONCA CITY, OK	2.05
STAMPEDE PASS, WA	2.85	ROME/GRIFFISS AFB, NY	2.04

OBSERVED PRECIPITATION

November 10 – 16, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

November 10 – 16, 1991

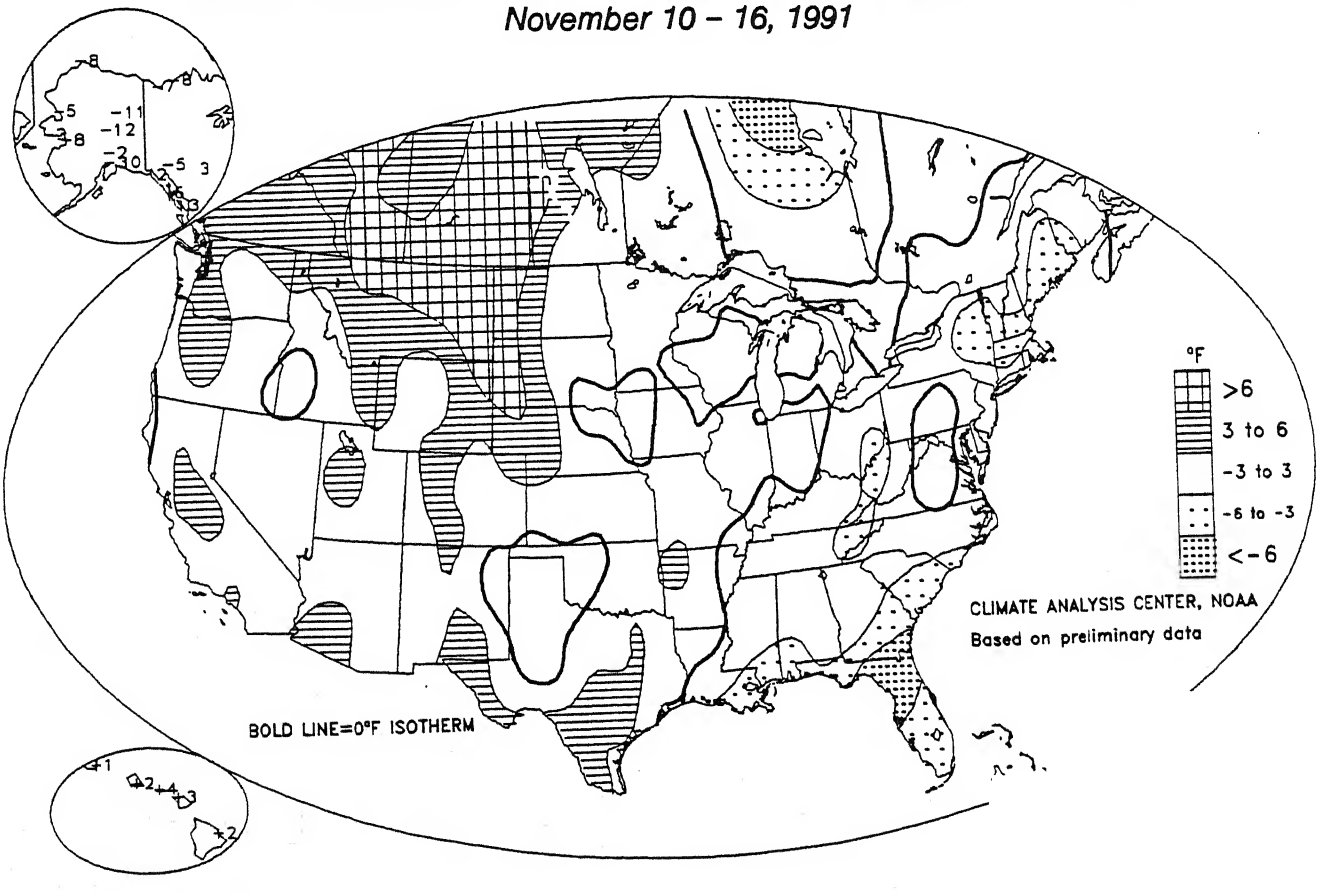


TABLE 2. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 4.5°F OR MORE ABOVE NORMAL FOR THE WEEK OF NOVEMBER 10 - 16, 1991*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
CUT BANK, MT	+9.8	39.9	GLENDALE/LUKE AFB, AZ	+5.2	64.5
MILES CITY, MT	+8.4	41.3	YUMA, AZ	+5.0	69.6
GLASGOW, MT	+7.9	38.2	GREAT FALLS, MT	+5.0	40.1
HAVRE, MT	+7.6	39.1	MINOT, ND	+5.0	33.9
DICKINSON, ND	+6.8	37.1	FAYETTEVILLE, AR	+4.7	52.0
WILLISTON, ND	+6.5	35.8	GILLETTE, WY	+4.7	39.1
EAGLE, CO	+6.4	38.3	JUNEAU, AK	+4.7	37.9
SITKA, AK	+6.1	43.7	PHOENIX, AZ	+4.6	65.9
RAPID CITY, SD	+6.1	41.8	SAN ANTONIO, TX	+4.6	64.7
LEWISTOWN, MT	+6.1	38.5	DELTA, UT	+4.6	42.1
VICTORVILLE/GEORGE AFB, CA	+5.5	55.2	BUTTE, MT	+4.6	32.8
BILLINGS, MT	+5.5	41.2			

TABLE 3. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 5.0°F OR MORE BELOW NORMAL FOR THE WEEK OF NOVEMBER 10 - 16, 1991*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
BETTLES, AK	-16.9	-15.1	MELBOURNE, FL	-5.8	62.9
FAIRBANKS, AK	-12.4	-6.9	JACKSONVILLE, FL	-5.7	56.6
MCGRATH, AK	-12.1	-4.8	NORTHWAY, AK	-5.6	-6.1
CROSS CITY, FL	-11.5	55.3	TALLAHASSEE, FL	-5.3	53.8
FT YUKON, AK	-11.1	-14.1	WAYCROSS, GA	-5.3	54.1
BIG DELTA, AK	-10.3	-1.1	TAMPA, FL	-5.3	61.9
BETHEL, AK	-9.1	9.9	GULKANA, AK	-5.1	3.9
BARROW, AK	-8.2	-7.8	DAYTONA BEACH, FL	-5.1	60.5
BRUNSWICK, GA	-6.9	53.8	KEY WEST, FL	-5.1	70.5
GAINESVILLE, FL	-6.3	57.3	ILIAMNA, AK	-5.0	19.7
KOTZEBUE, AK	-6.0	3.6	APALACHICOLA, FL	-5.0	56.5
ST PETERBURG-CLEARWATER, FL	-6.0	63.4	ORLANDO, FL	-5.0	62.6
VERO BEACH, FL	-5.9	63.5	WEST PALM BEACH, FL	-5.0	67.2

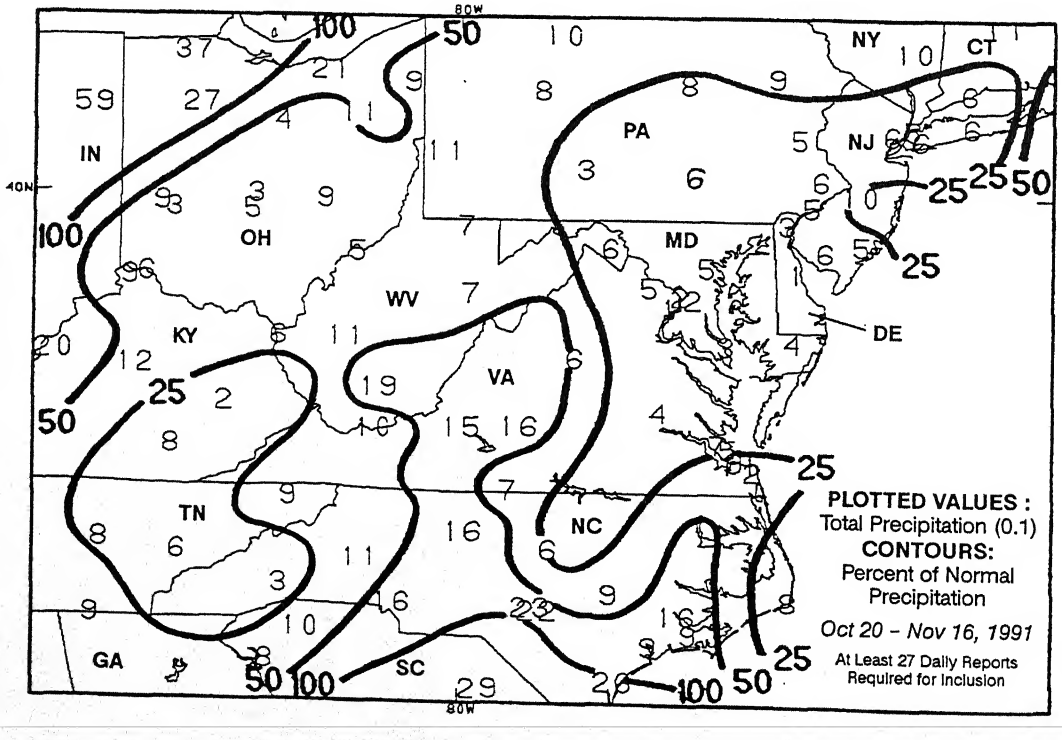
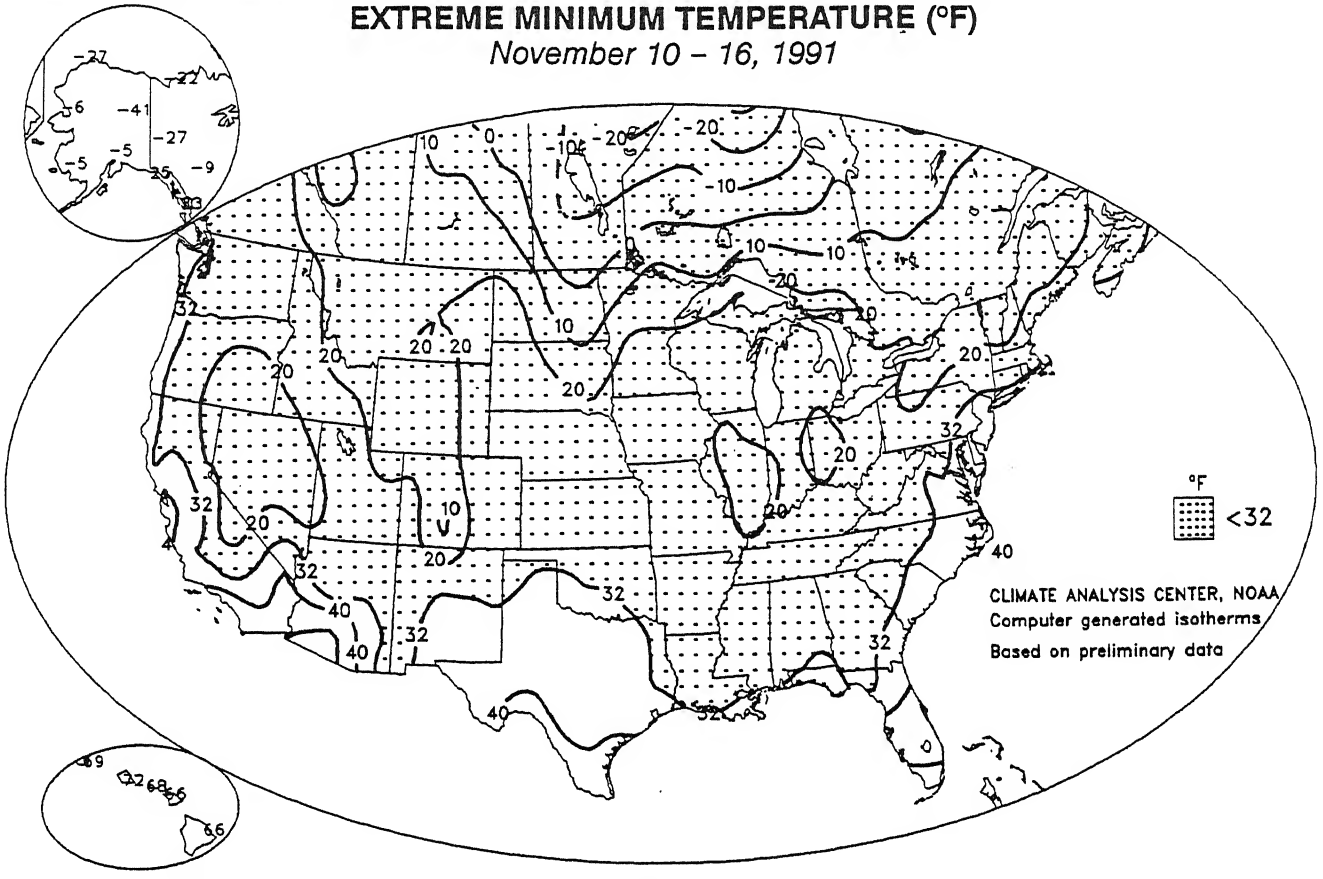


FIGURE 1. *A major storm system early last week brought much needed rain (snow and freezing rain in the higher elevations) to the Carolinas and southern and central sections of the Appalachians and Piedmont, reducing the threat of wildfires. Little or no rain fell east and west of the Appalachians from Virginia northward, however, as significant moisture deficits exceeding two and a half inches have accumulated during the past four weeks in the mid-Atlantic and Tennessee and Ohio Valleys. Eastern sections of Tennessee, Kentucky, Virginia, Maryland, and southern Pennsylvania, as well as most of New Jersey and southeastern New York, received less than 25% of normal precipitation during this period.*

EXTREME MINIMUM TEMPERATURE (°F)

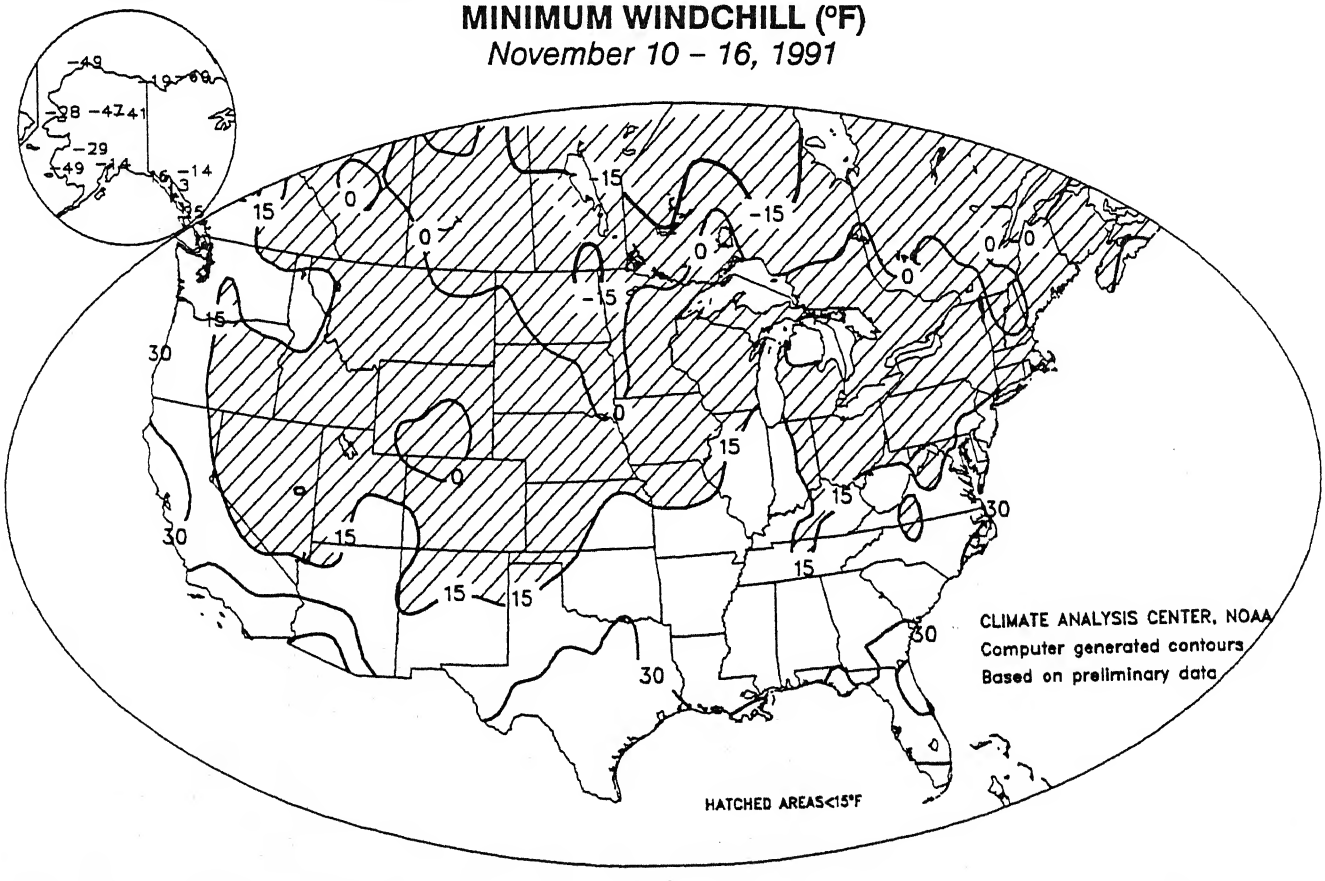
November 10 – 16, 1991



Cold Canadian air remained in the eastern U.S. until late in the week as temperatures dipped into the teens over the Midwest, lower Great Lakes, and northern New England. Temperatures stayed above freezing only along the Pacific, Gulf, and southern and mid-Atlantic coastlines, desert Southwest, and southern Texas (top). Fortunately, wind chills were generally higher than during November 3 – 9 as subzero values were limited to the northern Plains and central Rockies (bottom).

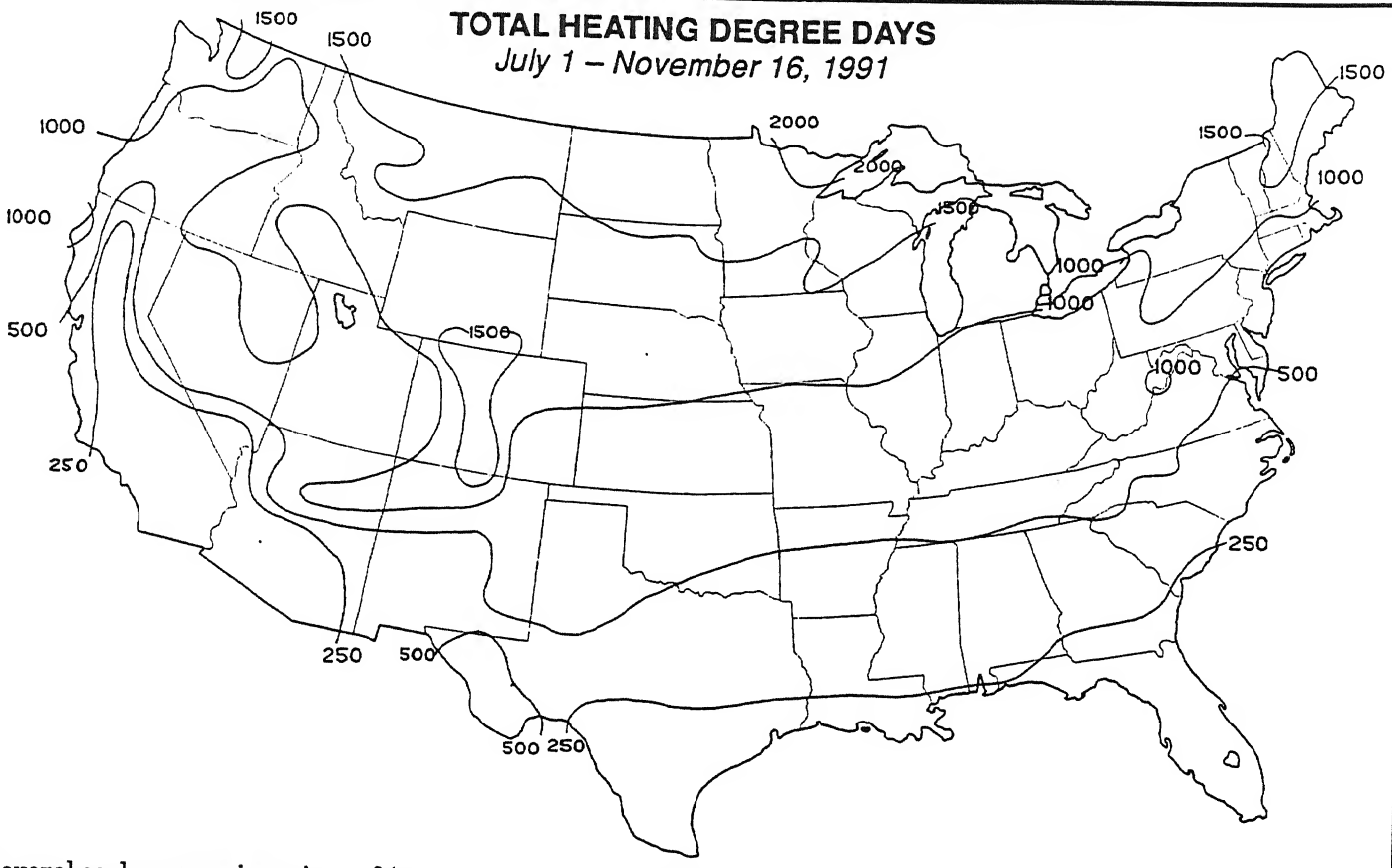
MINIMUM WINDCHILL (°F)

November 10 – 16, 1991



TOTAL HEATING DEGREE DAYS

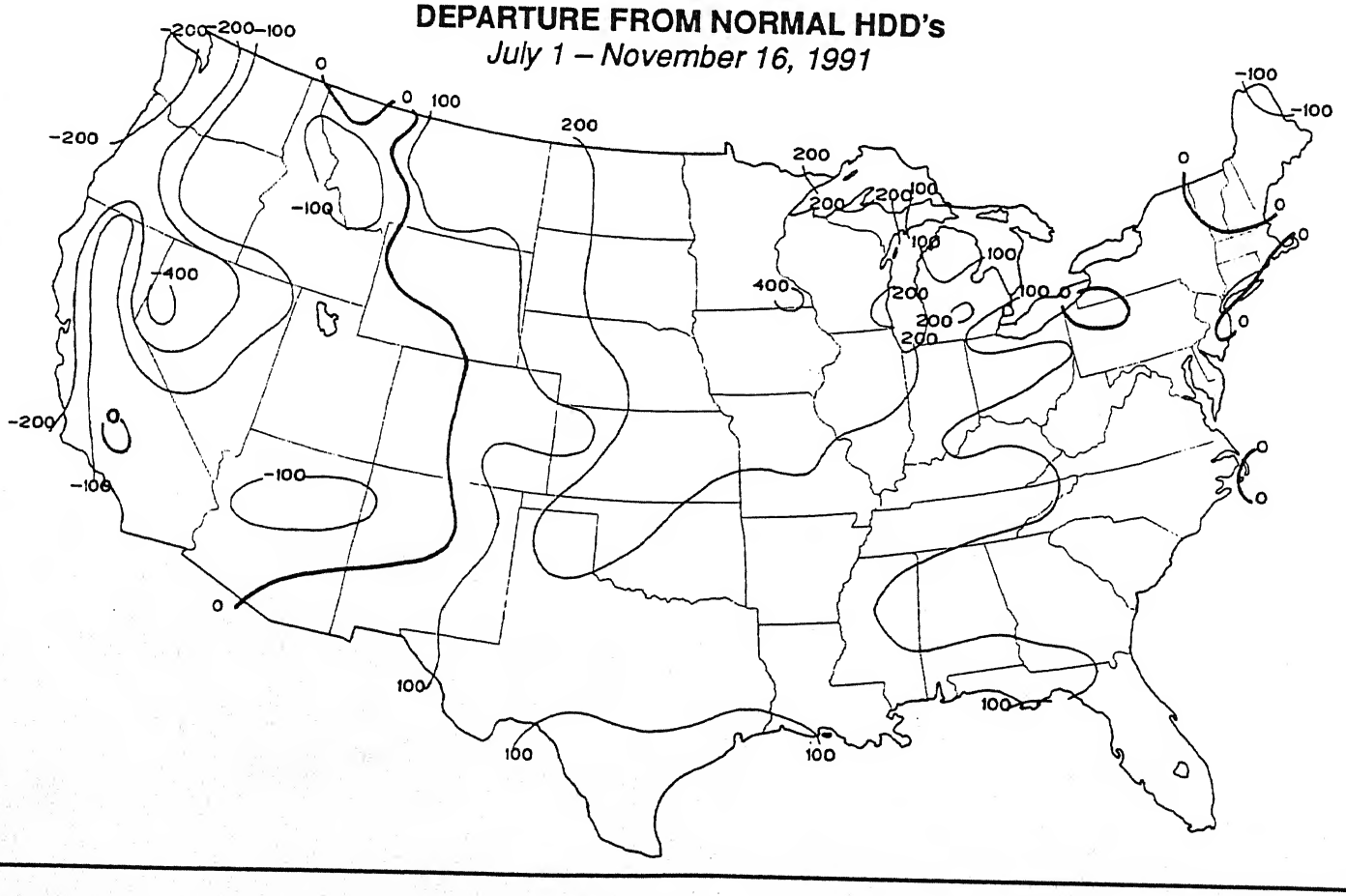
July 1 – November 16, 1991



Several early-season invasions of Arctic air generated significant heating usage across northern sections and higher elevations in the Rockies, Plains, Midwest, Appalachians, and Northeast (top). The cold spells produced above normal heating demand in most of the eastern three-quarters of the nation, with portions of the Great Pains and upper Midwest recording 300 – 400 more HDD's than normal (bottom).

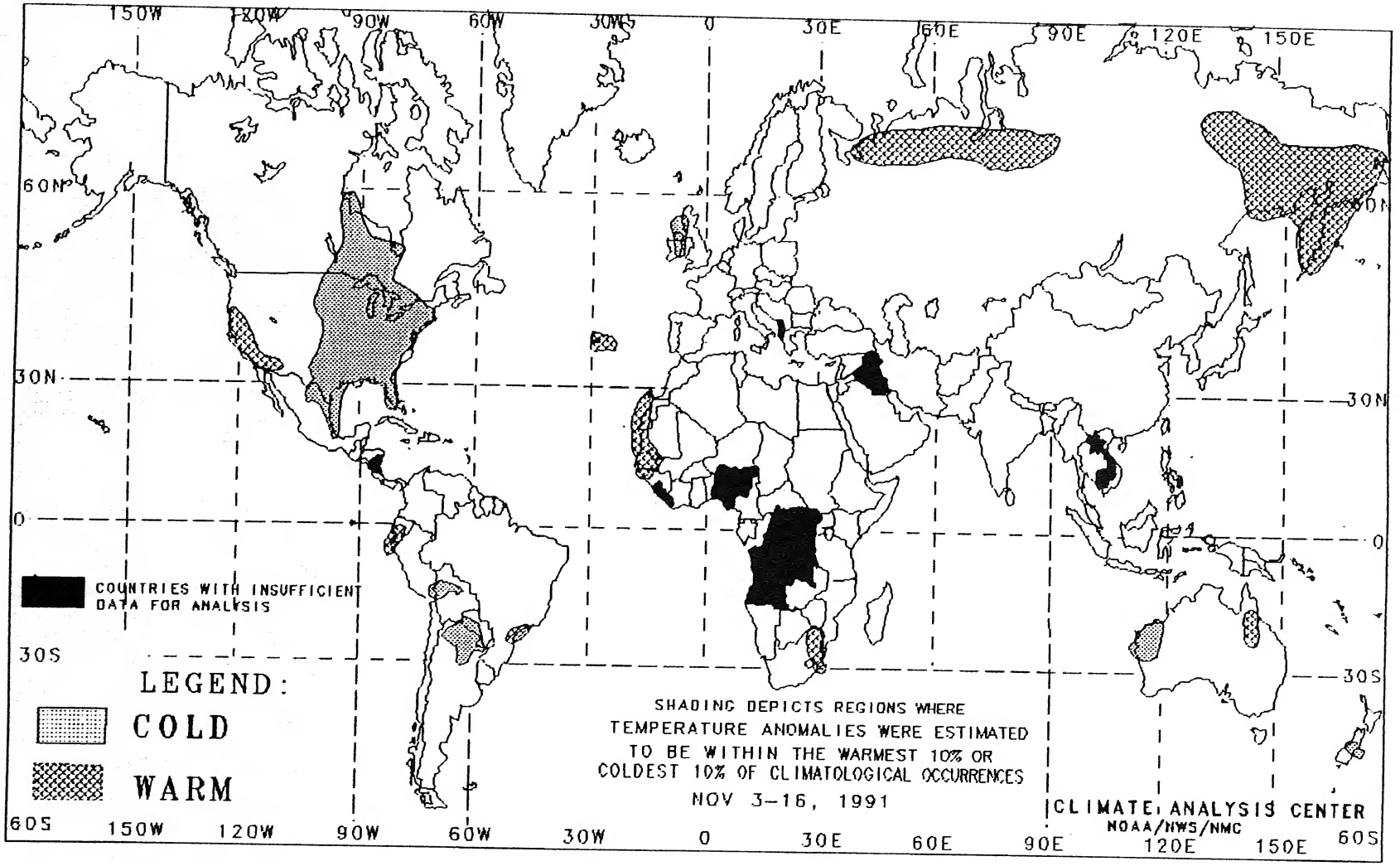
DEPARTURE FROM NORMAL HDD's

July 1 – November 16, 1991



2–WEEK GLOBAL TEMPERATURE ANOMALIES

NOVEMBER 3 – 16, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

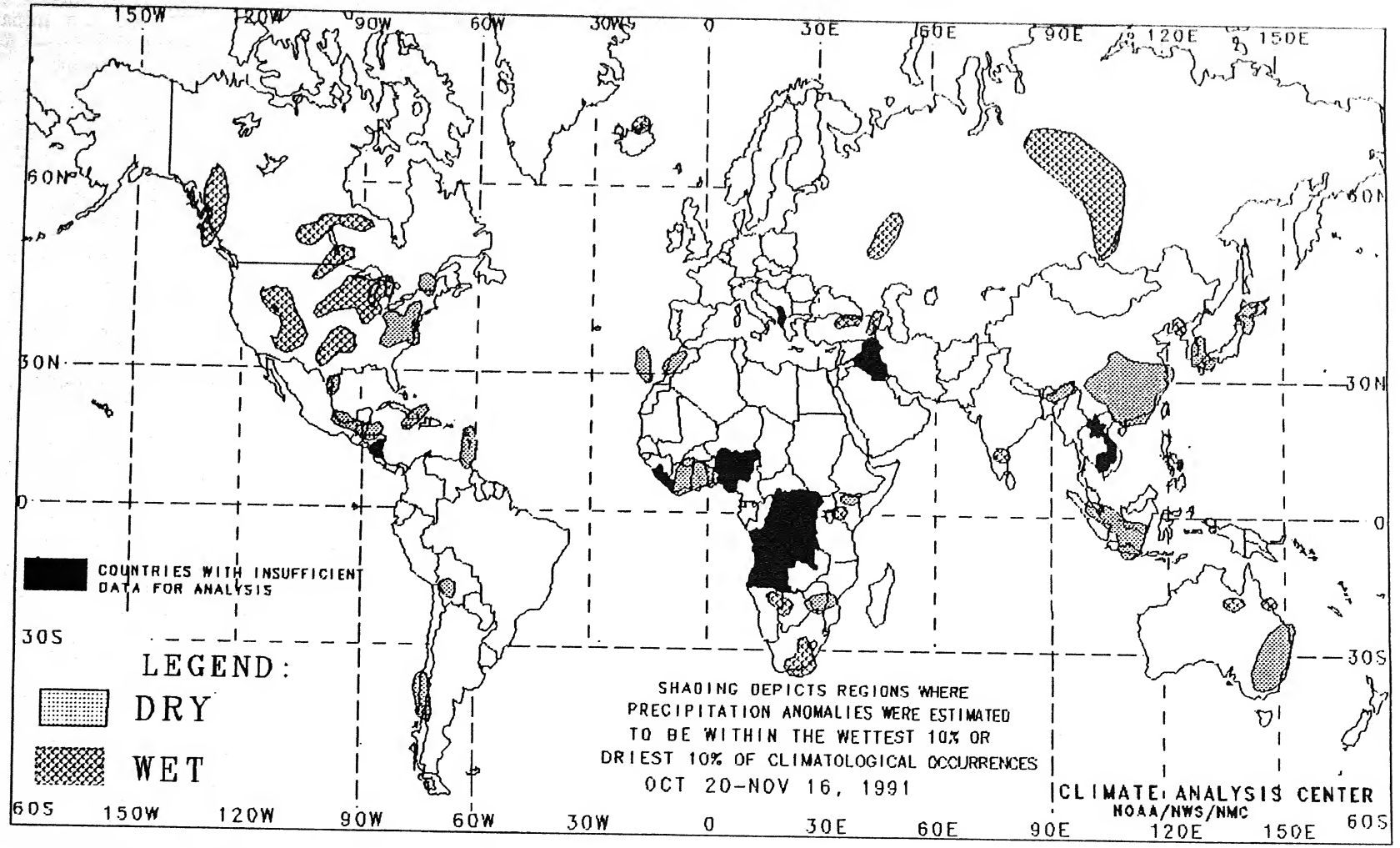
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4–WEEK GLOBAL PRECIPITATION ANOMALIES

OCTOBER 20 – NOVEMBER 16, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

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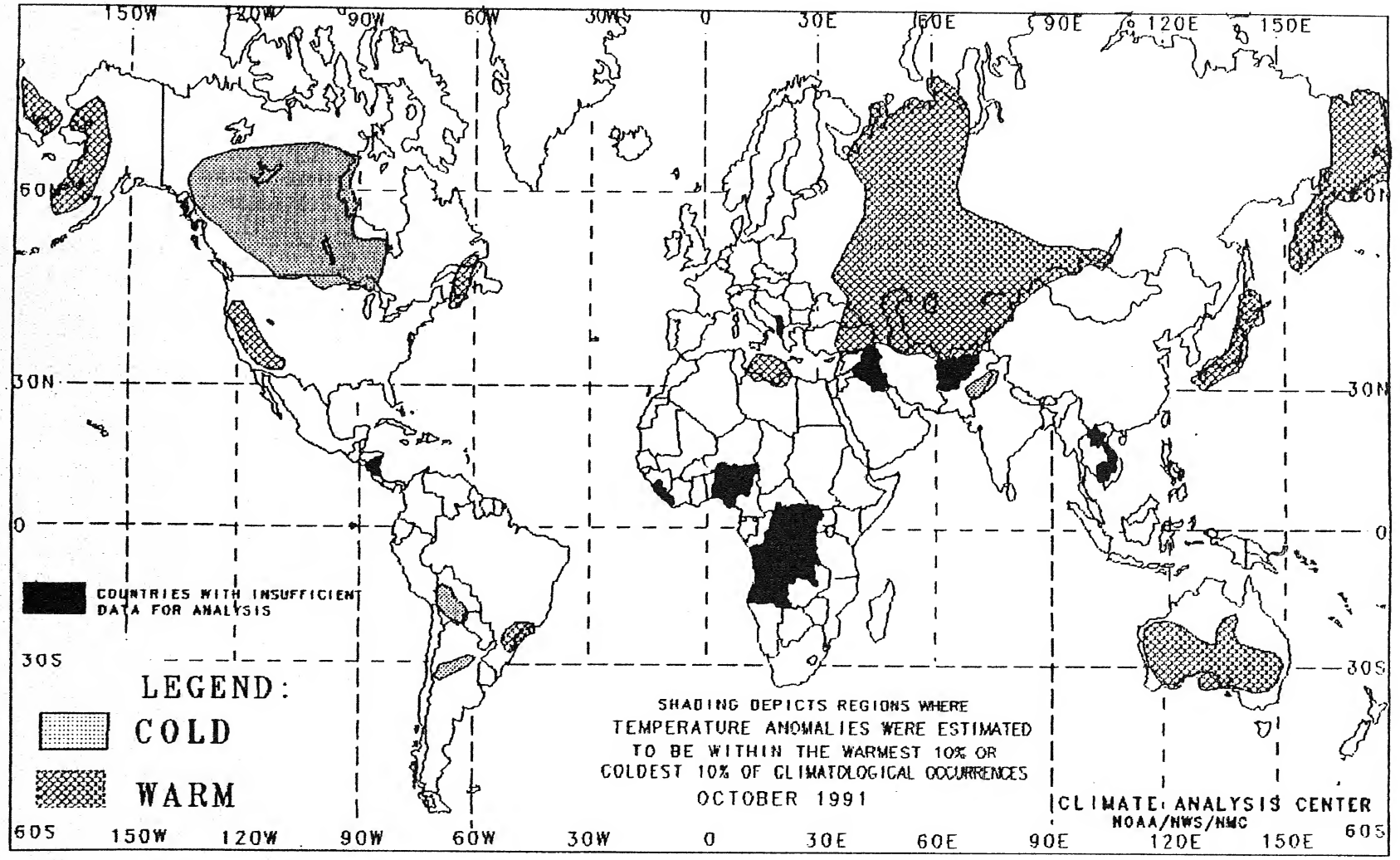
MONTHLY GLOBAL TEMPERATURE ANOMALIES

OCTOBER 1991



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This chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

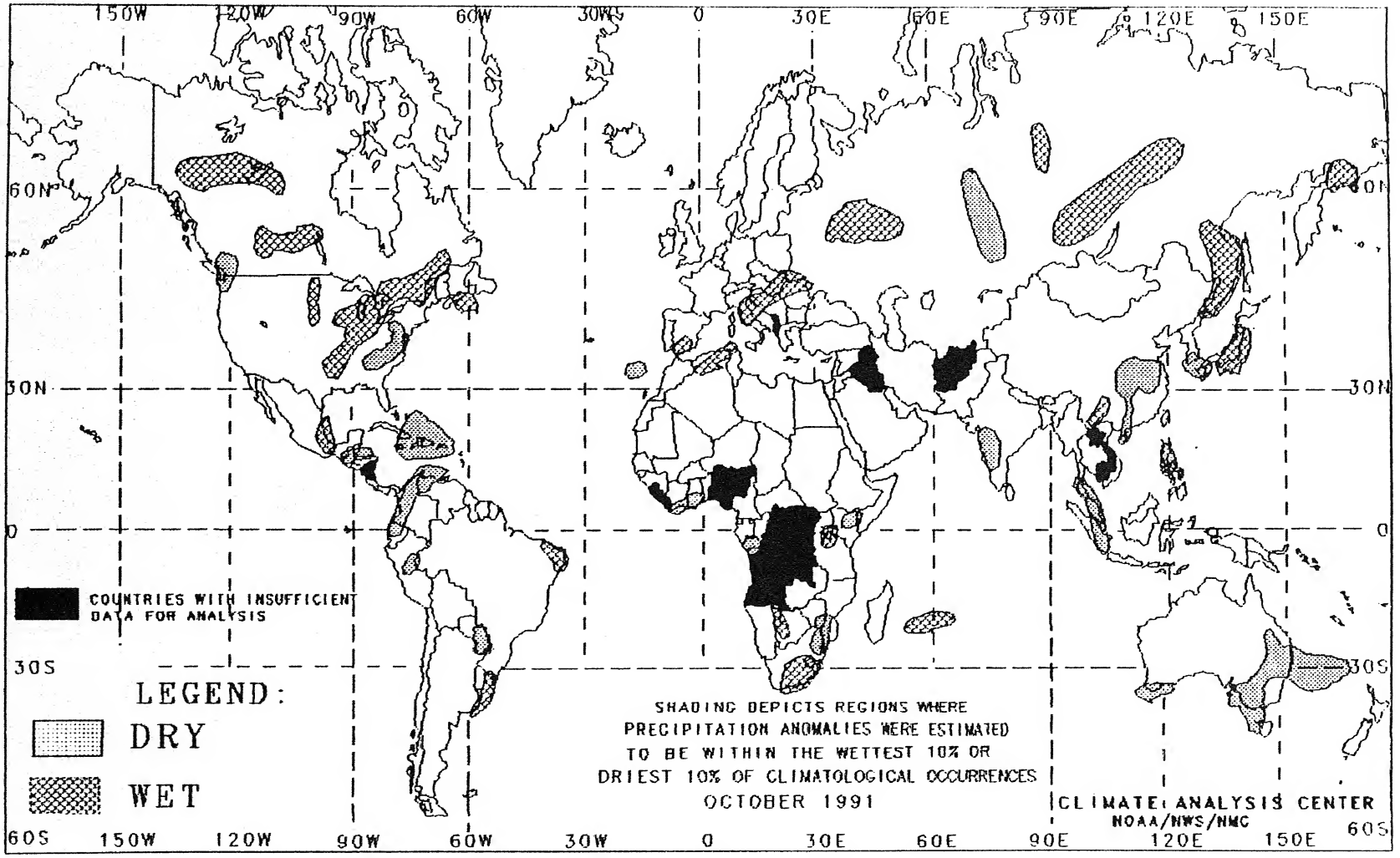
PRINCIPAL TEMPERATURE ANOMALIES

OCTOBER 1991

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
Western Alaska	−2 to +5	+2 to +3	Very mild second half of October
Canada and Adjacent North–Central United States	−6 to +6	−2 to −5	Very cold second half of October
Southwestern United States	+14 to +27	+2 to +4	Very warm first half of October
Canadian Maritime Provinces	+6 to +10	Around +2	Very mild first half of October
SOUTH AMERICA AND EASTERN PACIFIC			
Bolivia	+8 to +25	−2 to −4	COOL – 2 to 6 weeks
North–Central Argentina	+17 to +18	Around −2	COLD – 2 to 4 weeks
Southeastern Brazil	+18 to +21	Around +2	Very warm second half of October
EUROPE AND THE MIDDLE EAST			
Eastern Turkey and Eastern European Soviet Union	+4 to +23	+2 to +5	MILD – 2 to 10 weeks
AFRICA			
Northern Libya	+23 to +25	+2 to +3	WARM – 2 to 10 weeks
ASIA			
Kazakhistan and Western Siberia	−1 to +18	+2 to +5	MILD – 2 to 22 weeks
East–Central Pakistan and Northern India	+22 to +25	Around −2	Very cold first half of October
Extreme Eastern Siberia	−5 to +7	+2 to +5	MILD – 7 to 10 weeks
Japan	+8 to +19	+2 to +3	WARM – 2 to 7 weeks
AUSTRALIA AND WESTERN PACIFIC			
Australia	+19 to +32	+2 to +5	WARM – 2 to 7 weeks

MONTHLY GLOBAL PRECIPITATION ANOMALIES

OCTOBER 1991



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In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

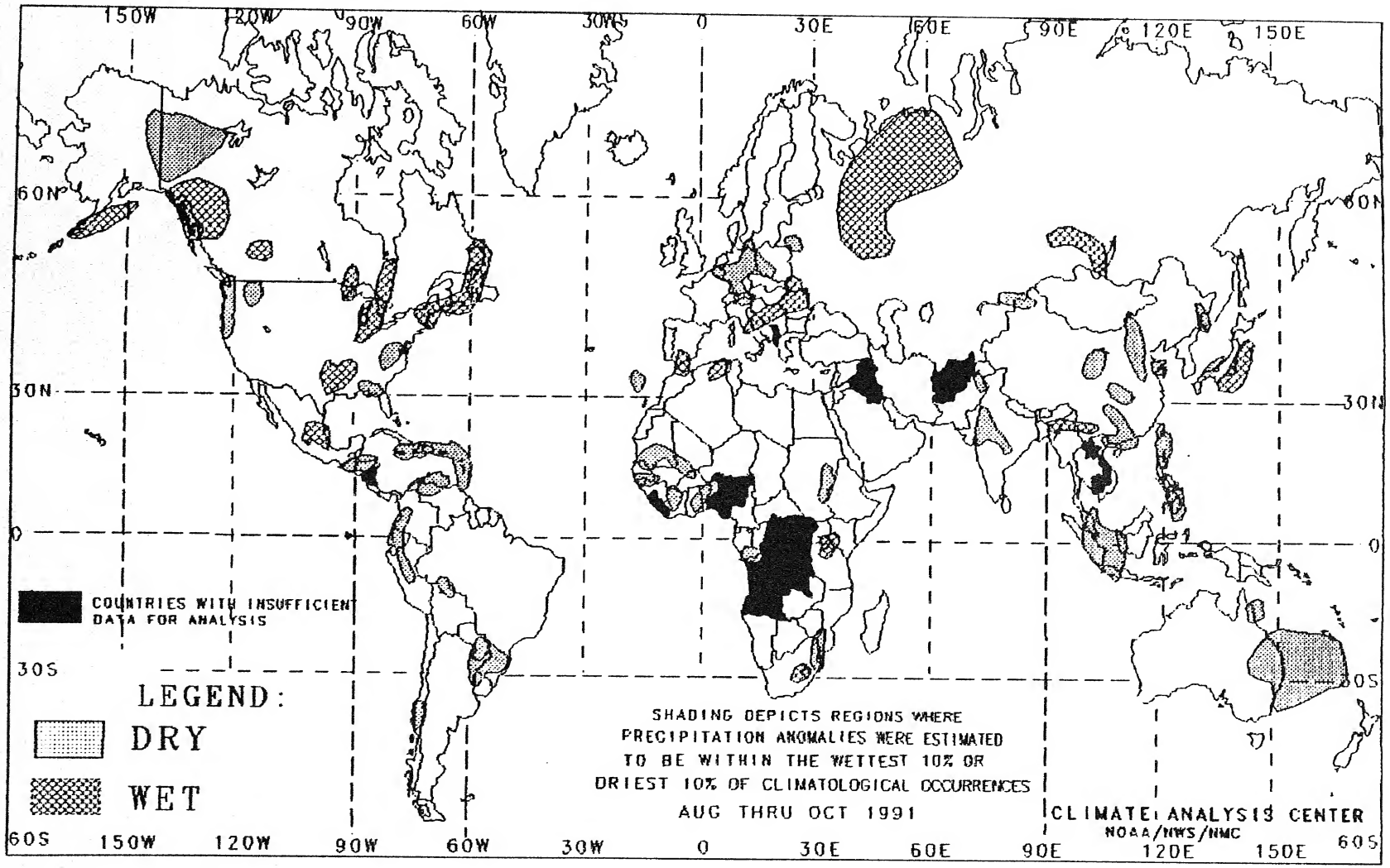
PRINCIPAL PRECIPITATION ANOMALIES

OCTOBER 1991

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
West–Central Canada	39 to 75	180 to 272	WET – 2 to 5 weeks
South–Central Canada	47 to 84	252 to 399	WET – 2 to 8 weeks
Western Washington and Southwestern British Columbia	27 to 59	24 to 37	DRY – 14 weeks
North–Central United States	54 to 59	241 to 298	Heavy precipitation second half of October
Midwestern United States and Southeastern Canada	105 to 238	175 to 349	WET – 2 to 6 weeks
Nova Scotia	183 to 244	151 to 209	WET – 2 to 5 weeks
East–Central and Southeastern United States	0 to 14	0 to 23	DRY – 5 to 14 weeks
Eastern Mexico	138 to 364	282 to 305	WET – 2 to 6 weeks
Central America	98 to 137	28 to 35	DRY – 4 weeks
Caribbean Islands	15 to 46	9 to 33	DRY – 6 to 10 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Northwestern South America	13 to 111	18 to 50	DRY – 4 to 10 weeks
Central Peru	46 to 109	27 to 42	DRY – 7 weeks
Extreme Eastern Brazil	66 to 161	284 to 505	Heavy precipitation second half of October
Paraguay	21 to 39	16 to 21	DRY – 6 to 10 weeks
Eastern Uruguay and East–Central Argentina	172 to 310	207 to 238	WET – 4 to 10 weeks
EUROPE AND THE MIDDLE EAST			
Central European Soviet Union	79 to 115	183 to 393	WET – 2 to 4 weeks
South–Central Europe	56 to 232	213 to 309	WET – 4 to 10 weeks
Southern Spain	113 to 195	202 to 363	WET – 10 weeks
Madeira	0 to 1	0 to 1	DRY – 10 weeks
AFRICA			
Northern Algeria	88 to 112	206 to 409	WET – 5 weeks
Gulf of Guinea Coast	48 to 78	25 to 43	DRY – 8 weeks
Congo	2 to 21	3 to 18	DRY – 4 weeks
Northern Kenya	1 to 28	1 to 20	DRY – 10 weeks
Southwestern Kenya and Northern Tanzania	201 to 208	265 to 268	WET – 8 weeks
Northeastern Namibia and Western Botswana	55 to 86	273 to 405	Heavy precipitation second half of October
Northern South Africa and Southeastern Zimbabwe	0 to 17	1 to 19	DRY – 10 weeks
South Africa	82 to 228	198 to 578	WET – 2 to 10 weeks
Indian Ocean Islands	125 to 170	289 to 443	WET – 8 to 10 weeks
ASIA			
Western Siberia	6 to 22	20 to 41	DRY – 4 to 6 weeks
Northwestern Siberia	114 to 116	195 to 277	WET – 4 weeks
Central Siberia	38 to 99	173 to 532	WET – 4 to 10 weeks
Southeastern Siberia	84 to 126	198 to 202	Heavy precipitation second half of October
Eastern Siberia	59 to 92	207 to 209	Heavy precipitation second half of October
Central Japan	216 to 725	156 to 304	WET – 4 to 6 weeks
Southern South Korea and Western Japan	1 to 27	3 to 26	DRY – 4 to 5 weeks
Eastern China	0 to 28	0 to 23	DRY – 5 to 14 weeks
South–Central China	132 to 168	201 to 207	WET – 2 to 4 weeks
West–Central India	0 to 33	0 to 36	DRY – 6 weeks
Malaysia	58 to 146	29 to 45	DRY – 4 to 5 weeks
AUSTRALIA AND WESTERN PACIFIC			
Philippines	33 to 83	10 to 39	DRY – 6 weeks
Southwestern Australia	15 to 29	40 to 87	DRY – 7 weeks
Eastern Australia	0 to 42	0 to 44	DRY – 5 to 18 weeks

3–MONTH GLOBAL PRECIPITATION ANOMALIES

AUGUST – OCTOBER 1991

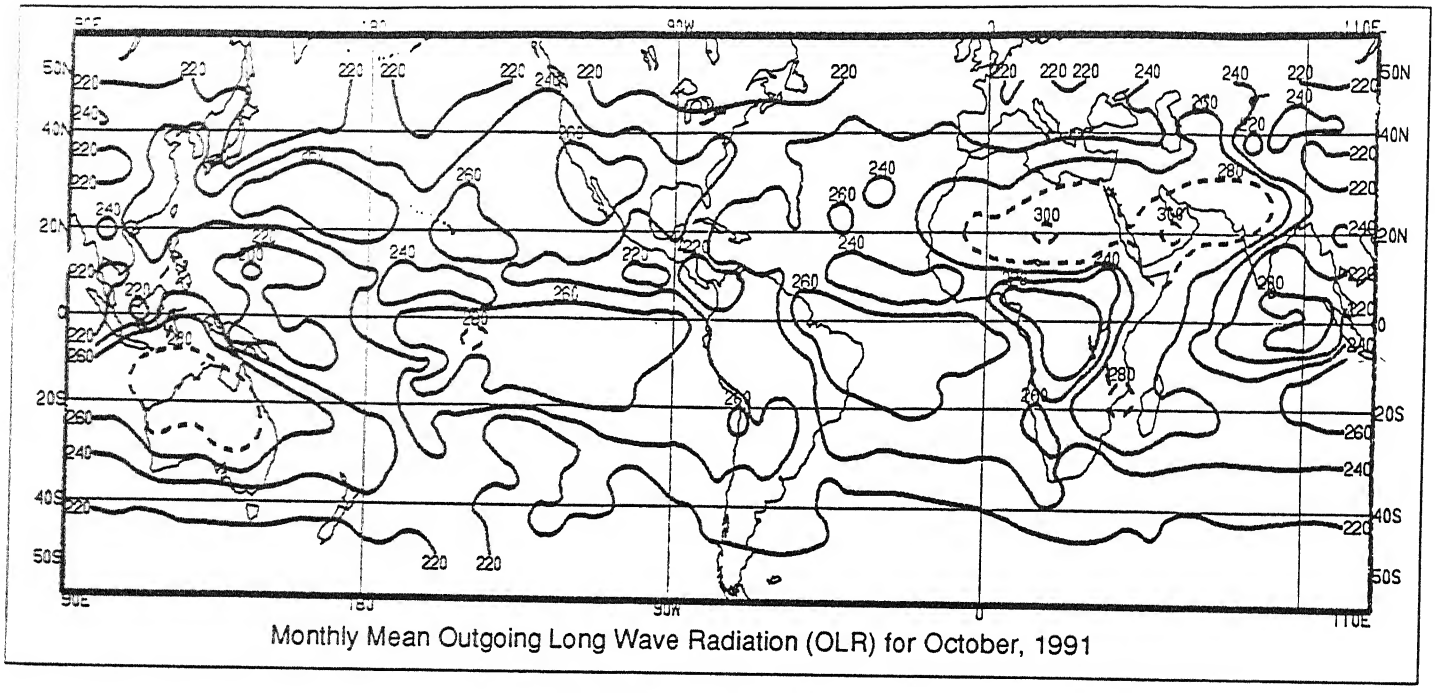


The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total three month precipitation exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

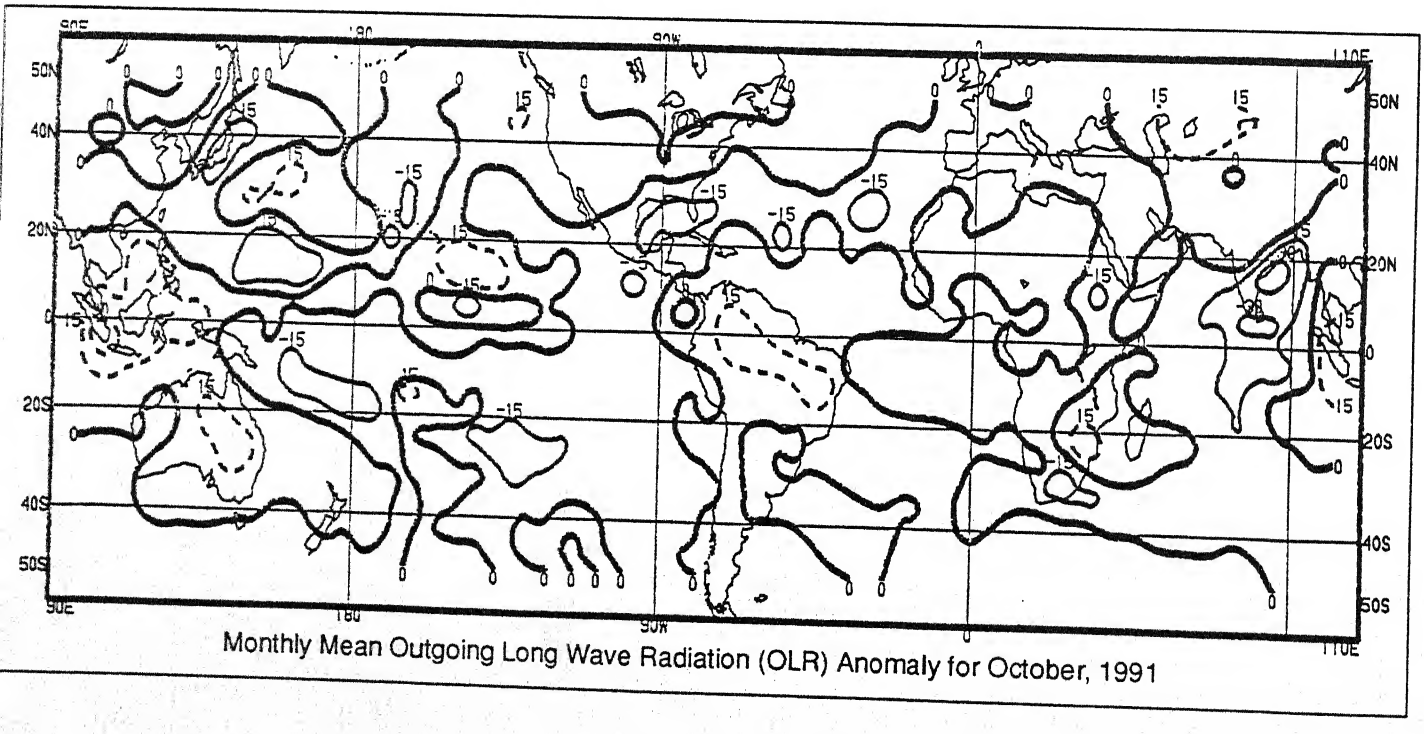


Monthly Mean Outgoing Long Wave Radiation (OLR) for October, 1991

EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N – 20°S) that receive primarily convective rainfall, a mean OLR value of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non–convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 – 1988 base period mean. Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.



Monthly Mean Outgoing Long Wave Radiation (OLR) Anomaly for October, 1991

SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER,NMC
NATIONAL WEATHER SERVICE, NOAA
REVIEW OF THE 1991 AFRICAN SAHEL SEASON

The previous update on the 1991 African Sahel rainy season (see Weekly Climate Bulletin #91/39, dated September 28, 1991, pp. 9-10, for more details) described a rather uneventful 1991. A standardized rainfall index, using May-September totals from up to 20 locations in the western Sahel to discern how each season compares with normal, indicated an atypically dry 1991 season (see front cover). This index, however, does not take into account the timeliness of the rains. The 1991 season threatened to bring adversely low rainfall totals to a few portions of the Sahel and, simultaneously, to deluge other sections. Fortunately, timely weather changes seemed to occur before these trends engendered serious agricultural or hydrological impacts.

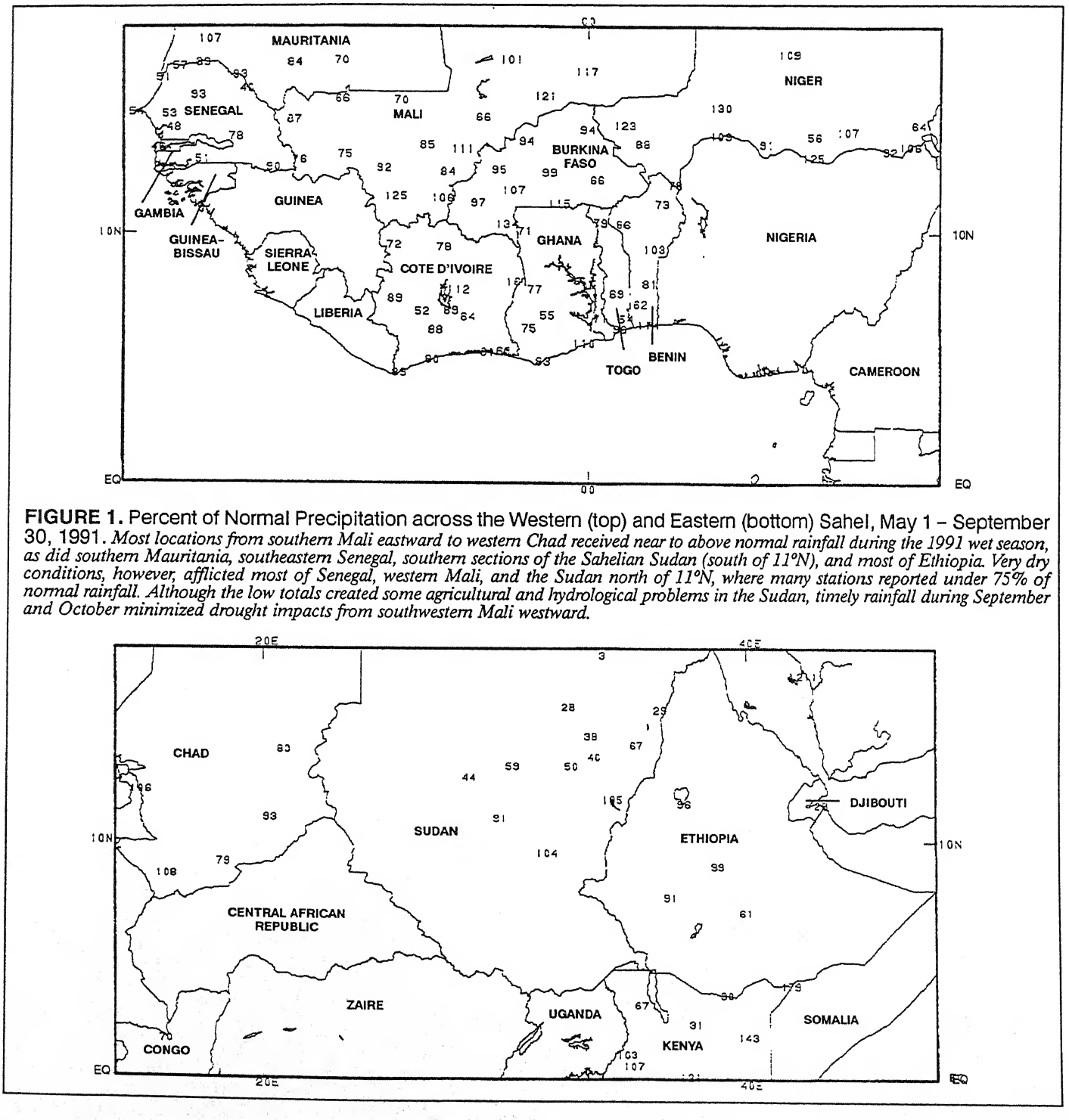


FIGURE 1. Percent of Normal Precipitation across the Western (top) and Eastern (bottom) Sahel, May 1 - September 30, 1991. *Most locations from southern Mali eastward to western Chad received near to above normal rainfall during the 1991 wet season, as did southern Mauritania, southeastern Senegal, southern sections of the Sahelian Sudan (south of 11°N), and most of Ethiopia. Very dry conditions, however, afflicted most of Senegal, western Mali, and the Sudan north of 11°N, where many stations reported under 75% of normal rainfall. Although the low totals created some agricultural and hydrological problems in the Sudan, timely rainfall during September and October minimized drought impacts from southwestern Mali westward.*

The 1991 wet season got off to an abnormally early and wet start across parts of Niger, Chad, and the Sudan south of 11°N in May. These locations went on to record below normal amounts during June and fairly typical totals during the rest of the season, limiting significant seasonal surpluses to portions of south-central and southwestern Niger, extreme southern Burkina Faso, and adjacent Mali, where heavy rains were measured sporadically during July and August. In addition, scattered downpours generated isolated flooding in northern Ghana, southern Burkina Faso, and the Sudan during August, but subsequently drier conditions allowed these regions to quickly recover.

In contrast, very dry conditions afflicted southwestern Mali, Senegal, and southern Mauritania until mid-July, when seasonal rains finally commenced. The last half of July and most of August brought above normal rainfall to the region, and unusually heavy late-season rains continued through September and into October. The wet season as a whole brought only 40%–60% of normal rainfall to northern and western Senegal, with somewhat closer to normal totals measured farther north and east. Crop development got off to a very late start because of the dryness, but heavy September rains and significant October totals minimized agricultural impacts despite the very low totals recorded in portions of Senegal. Farther east, much of the Sudan north of 11°N also experienced an abnormally dry 1991 rainy season, despite spotty flooding slightly south of this region, while eastern Ethiopia and Djibouti received below normal rainfall during the May–September 1991, where the summer wet season is secondary to a typically rainy late winter and early fall.

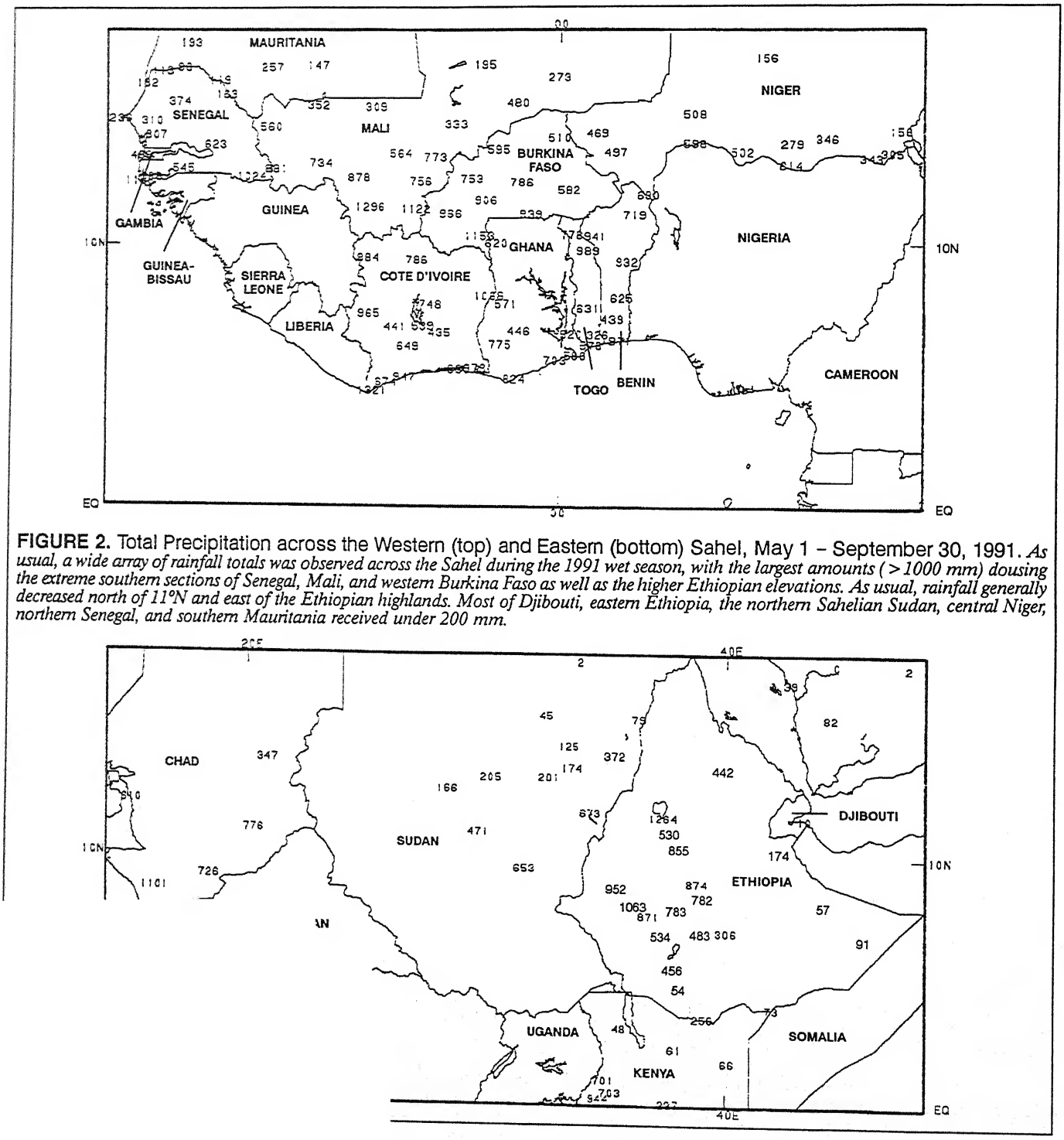
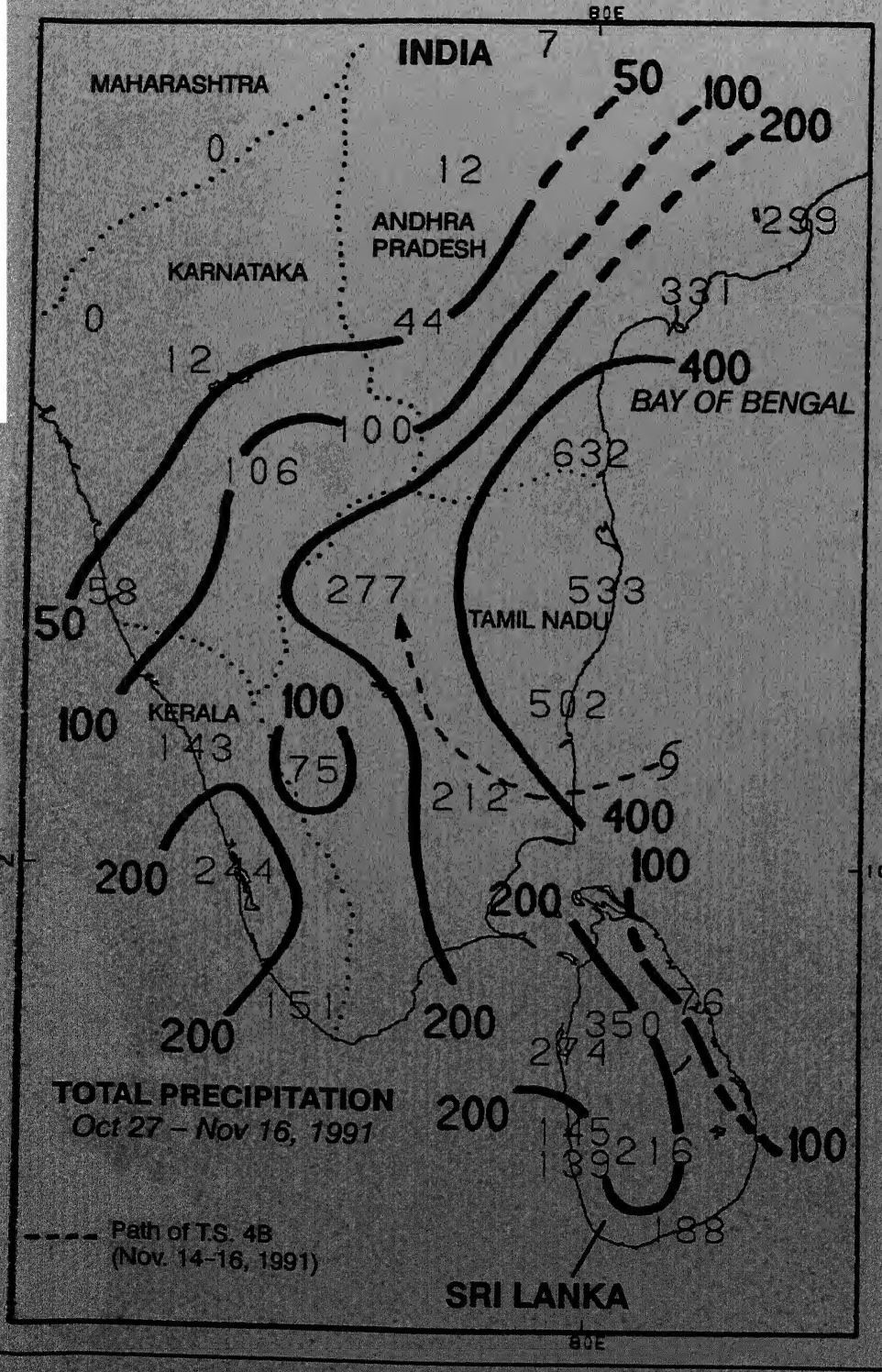


FIGURE 2. Total Precipitation across the Western (top) and Eastern (bottom) Sahel, May 1 – September 30, 1991. *As usual, a wide array of rainfall totals was observed across the Sahel during the 1991 wet season, with the largest amounts (>1000 mm) dousing the extreme southern sections of Senegal, Mali, and western Burkina Faso as well as the higher Ethiopian elevations. As usual, rainfall generally decreased north of 11°N and east of the Ethiopian highlands. Most of Djibouti, eastern Ethiopia, the northern Sahelian Sudan, central Niger, northern Senegal, and southern Mauritania received under 200 mm.*

SPECIAL CLIMATE UPDATE

CLIMATE ANALYSIS CENTER, NMC
NATIONAL WEATHER SERVICE, NOAA

TROPICAL STORM 4B AGGRAVATES WET SPELL



Tropical Storm 4B pounded southern India for two days before disintegrating in northern Tamil Nadu as the week ended. The storm brought winds gusting up to 100 kph and torrential rains locally reaching 580 mm to the southeastern coast during November 14–16, 1991. More than 50,000 individuals were forced to leave their dwellings after several rivers swelled out of their banks, causing extensive damage to crops and property near Pondicherry. Five individuals lost their lives when heavy rains and gusty winds caused several houses to collapse, according to press reports. The widespread downpours generated by Tropical Storm 4B exacerbated three weeks of abnormally heavy rain through much of southern India and Sri Lanka. Up to 350 mm have drenched north-central Sri Lanka while as much as 632 mm have fallen on extreme southern Andhra Pradesh. The heavy rains in extreme southern India and Sri Lanka correllate well with the global anomaly patterns expected during and El Nino episode, which generally coincides with above normal October through December rainfall totals across southern sections of Kerala and Tamil Nadu and throughout Sri Lanka